M294 Precision-feeding dairy heifers with different levels of dietary fiber and F:C. Effects on protein utilization, N efficiency, and rumen fermentation. G. J. Lascano*[1] and A. J. Heinrichs[2], [1]*The California Polytechnic State University, San Luis Obispo,* [2]*The Pennsylvania State University, University Park.*

The objective of this experiment was to determine the effects of manipulating dietary fiber level with differing forage to concentrate (F:C) ratios on protein rumen utilization of precision-fed dairy heifers. Six cannulated Holstein heifers (486.98 ± 15.07 kg BW) were randomly assigned to 2 levels of concentrate, HC (45% forage) and LC (90% forage) and to a forage type sequence [33% grass hay and wheat straw HS, 67% corn silage CS (Low fiber); 50% HS, 50% CS (Medium fiber); and 67% HS, 33% CS (High fiber)] within forage level administered according to a split-plot 3 × 3 Latin square design (21-d period). Similar N intake and rumen degradable protein (RDP) were provided (1.20 g N/kg BW 0.75), and casein was added to supply additional N to provide 1.80 g N/kg BW 0.75. Heifers fed HC had greater apparent total tract organic matter (OMD), neutral detergent fiber (NDF), and cellulose apparent digestibility (AD) than those fed LC diets ($P \leq 0.01$). Nitrogen AD was not different between F:C or with increasing levels of HS in diets, but N retention tended to decrease linearly as HS was increased in the diets ($P = 0.09$). Protozoa numbers were not different between F:C treatments, but HS interacted linearly. The HC-fed heifers had a greater VFA concentration ($P \leq 0.05$). Mean pH was not different among F:C rations. Increasing dietary fiber through HS affected RDP utilization and decreased DM, OM, NDF, ADF and cellulose AD linearly ($P \leq 0.05$). Microbial protein synthesis predicted from urinary purine derivatives decreased linearly with HS addition resulting in a linear decrease in N retention with HS addition ($P = 0.03$), which was opposite to rumen NH_3N and BUN, reflecting the inefficiency in N utilization as more HS was added to the diets. Rumen fermentation parameters, DM and fractional passages (solid and liquid) rates support the reduction in protein utilization and retention, microbial protein synthesis and AD observed as more dietary fiber is added to the rations of precision-fed dairy heifers.

Key Words: heifers, fiber, protein degradability